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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/506,932

02/18/2005

Masahide Taniguchi

H26-081 US

7008

21706 7590 02/25/2008

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ORANGEBURG, NY 10962-2100

EXAMINER

FORTUNA, ANA M

ART UNIT

PAPER NUMBER

1797

MAIL DATE

DELIVERY MODE

02/25/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/506,932	<b>Applicant(s)</b> TANIGUCHI ET AL.	
	<b>Examiner</b> Ana M. Fortuna	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2007.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

1. Claims 1, 2, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cribello et al (US 5,468,390) in view of Wu (US 6,039,873) or Charkoudian et al (US 5,885,456). The treatment of polysulfone membranes with acrylic acid monomers (vinyl monomers) and the exposing to UV irradiation is the patent (abstract; claims 1-11; column 1, lines 45 through column 2, line 60; column 5, lines 46-through column 7, lines 1-43). These limitations are also admitted to be known by Applicant, specification, and page 1, last paragraph. The effect in membrane irradiation and irradiation time on membrane performance, as reflected in increasing membrane flux can be done by using the information of examples 1-3 in patent '390. The term "photoactive" is inherent of the sulfone membrane used as support or base membrane, e.g. polysulfone, polyether sulfone (column 3, lines 30-45). Irradiating the membrane to graft the acrylic acid monomers and polymerize them on the polysulfone disclosed in patent '390; nonionizing irradiation ultraviolet light and "other UV sources, can be used in the process of patent '390 (column 5, lines 46-68), using wave length of 254 nm, or 450 W, at periods of time of t minutes and 3 minutes respectively is disclosed in the patent (column 5, examples 1-2). It would have been obvious to one skilled in the art at the

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time this invention was made to control the irradiations process, by determining a predetermined exposure time depending on the degree of energy applied and/or method of irradiation used during the process, to protect the membrane from damage, and obtain better results, which adjustment seems to be within the knowledge of the skilled in the art. Optimizing the irradiation range depending on membrane thickness, material, and percentage of grafted monomers on the polysulfone surface would have been obvious to the skilled artisan based on the time and intensities suggested in patent '390. Patent '390 teaches washing the membrane with water after the grafting or irradiation step, e.g to clean residues from the membrane (column 6, example 1). Washing or treating with alcohol is not suggested.

Wu et al teaches treating or modifying the surface of polysulfone membranes, by acrylate monomers by irradiation at a particular temperature range (see column 12, second paragraph), further washing the membrane with water and further with methanol to remove non-reacted residues from the membrane (column 15, lines 23-36). It would have been obvious to one skilled in this art at the time this invention was made to use alcohol solution after the water wash step or in substitution of water to clean the membrane from residues that are not reacted or grafted to the polysulfone support during the irradiation step, as suggested in Wu et al.

Patent '456 teaches post-treating a membrane containing grafted monomers of acrylic acid in a polysulfone base polymer by alcohol (see columns 11, lines 16-24). It would have been obvious to one skilled in this art to wash or treat the membrane with alcohol or -OH group containing solvents to clean residues from the membrane and/or further

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provide membrane wettability, and or to improve hydrophilic (membrane flux) properties. Patent '456 teaches removing unreacted copolymers, e.g. acrylamide monomers from the formed membrane by immersing the membrane in water (column 7, example 3); using water /methanol mixtures is also disclosed (column 9, lines 4-5); this patent also considers avoiding photochemical degradation (column 8, lines 30-51; column 3, line 64-column 4, line 26). The skilled artisan at the time this invention was made can be able to select the degree of irradiation, time of irradiation to achieve the best results, which degree of irradiation and time of exposure that avoid degradation of the polysulfone are known in the prior art discussed above, which is not limited to the particular methods, the skilled in the art can also, based on the disclosures discussed above, be able to used equivalent energies and /or methods to avoid the membrane degradation during surface modification.

### ***Response to Arguments***

2. Applicant's arguments filed 12/07/07 have been fully considered but they are not persuasive. Claims 1, 2 and 10 are pending in this application, claims 1 is amended to include the washing agent and does not positively recited a range of UV irradiation that overcomes the prior art. Claims 2 and 10 includes a UV ranges that appear to be equivalent to the wave length and energies disclosed in the prior art, as discussed above. The use of alcohol or mixtures of alcohol and water to remove similar (un-reacted) monomers after irradiation is known as discussed above. Although patent '456 discloses forming the membrane by copolymerization, after irradiation both, sulfone and copolymer (acrylic acid monomers), e.g. acrylate, which as discussed above are moved

form the membrane by washing with water and alcohol. The rejection above correspond to the rejection of claims 2 and 4 in previous Office Action. And is considered proper. Applicant remarks fails to compare the irradiation levels of the prior art with the presently claimed levels, and how they overcome the prior art.

***Conclusion***

3. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ana M. Fortuna whose telephone number is (571) 272-1141. The examiner can normally be reached on 9:30-6:00 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R. Sample can be reached on (571) 272-1376. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Ana M Fortuna  
Primary Examiner  
Art Unit 1797

/Ana M Fortuna/  
Primary Examiner, Art Unit 1797

February 15, 2008